

## The Church and Scientific Research

REV. CYRIL POWER, S.J.

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THE subject of our lecture this evening is the attitude of the Church towards scientific research. It is a subject well worthy of our attentive consideration because no calumny has been more industriously propagated by the enemies of the Church than that which brands her as an enemy of all progress in these particular branches of secular learning. This indeed is no new calumny: it is one which her enemies have used against her in every age of her long and glorious history. In the early ages, heretics denounced her as an enemy of the higher gnoses; a later age denounced her as an enemy of genuine humanism; in the eighteenth century she was denounced as the enemy of enlightenment. Hence it is no surprise to her to be denounced today as the enemy of scientific progress.

This calumny, moreover, has been specially rife in English-speaking countries. Three names stand out as especially connected with its dissemination, the names of Draper, White and Huxley. Draper published, as far back as 1874, his book entitled "The Conflict between Religion and Science." The mistakes—we shall not call them by a harsher name—were innumerable: they were refuted over and over again by Catholic apologists, and yet not so very long ago the book was republished without a single correction! Its author dogmatically declares, for the consumption of the uninstructed reader: "It has come to this that Roman Christianity and science are recognized by their respective adherents as being absolutely incompatible: they cannot exist together: one must yield to the other: mankind must make its choice: it cannot have both."

A fine example indeed of disregard for truth! What adherent of the Catholic Church has ever recognized that science is incompatible with her faith? The Fathers of the Vatican Council were, I suppose, the most authoritative

mouthpiece of the Church's attitude and that this was not their view we shall presently see. Pasteur, again, one of the giants of science, at the end of his long life of scientific work boldly declared that he had never seen any such incompatibility. "I have studied much," he says, "and through it I have come to have the simple faith of the Breton peasant: if I had studied more, I should have come to the still simpler faith of a Breton peasant's wife." It is certainly an amazing phenomenon that men presumably familiar with the names of such scientific men as Pasteur, Mendel, Röntgen and so many other adherents of both Catholicism and science, should continue to publish such unfounded statements as these.

No person, however, has done more to popularize this fiction than Thomas Huxley, whose brilliant writings are even still so widely read. He never ceased to teach that the Catholic Church was an enemy of all scientific progress. He was deeply impressed, his biographer tells us, with the "necessary antagonism between science and Roman Catholic doctrine." He spoke of the "intellectual degradation which would come of the general acceptance of Catholic views." In his "Lay Sermons" he writes of, "our great antagonist—I speak as a man of science—the Roman Catholic Church, the one spiritual organization which is able to resist and must as a matter of life and death resist the progress of science and modern civilization." Such attacks as these are scattered up and down throughout his writings, until by the subtle power of suggestion the unwary reader is liable to go away fully convinced that the charge is true, although no reasons at all, or at least very flimsy and oft-refuted ones, are adduced to substantiate the charge.

"If you throw enough mud, some of it will stick"—so runs the old proverb and its truth is abundantly verified in the case of the mud hurled at the Church by those so-called votaries of science. Many non-Catholics are firmly convinced that in this matter the Catholic Church is hopelessly reactionary. Many Catholics, too, who are not well instructed, are, to say the least, puzzled over the whole matter and fear that there must be some truth at the basis of a belief so widely disseminated.

It is with the view of combating such false impressions that I propose to place before you tonight some facts to show you how utterly unfounded such charges are; to

demonstrate that, instead of being hostile to progress in learning, the Church has in all ages been the patroness of the sciences and has only at times reluctantly interfered when scientists have strayed beyond their own domains and entered into those pertaining to dogma and Revelation.

In attempting to estimate the Church's attitude towards science, two lines of inquiry lie open before us. We might in the first place examine her own authoritative declarations on the point as made known to us through her Councils and her Pontiffs, or we might on the other hand inquire into the practical part she has played throughout her history in forwarding or retarding advances in knowledge. I propose to consider both these aspects of the question: the first very briefly as being the less important, the second in greater detail because it is from her practical actions that her attitude towards science must be chiefly judged.

The last great Council of the Church—the Vatican Council—treated of this very point in the third chapter of its decrees. Let me therefore briefly summarize for you the teaching of the Council, for nowhere else can we find a more authoritative statement of the Catholic position.

The Council begins by reminding us that men can obtain knowledge in two ways: either by direct Revelation on the part of God, or by the use of that power of reason which God has planted in man's nature. In this direct Revelation God has, for the most part, treated of those things which pertain to man's supernatural destiny, which he could never have learned by the use of his reasoning powers alone. To his reason God has left the discovery of those truths relating to the natural order which are useful or necessary for his life here on earth. We must note, however, the Council reminds us, that both these kinds of knowledge come from one and the same source, God: the first coming immediately from Him; the second mediately, through man's reason. Now God who is absolute Truth, who can neither deceive nor be deceived, can never contradict Himself, and so between the knowledge man receives from Revelation and the knowledge he obtains by the use of his reason there can never be any real conflict. Hence, the Council tells us, if at times there arises an apparent conflict between Revelation and natural science, this is due either to the fact that some private individual has not interpreted Revelation according to the mind of the Church, or to the fact that the

scientist has drawn erroneous conclusions from his scientific observations.

Having thus laid down relations which must necessarily exist between Revelation and science, the Council goes on to declare its sympathy with all secular knowledge and its welcome for all advances made in physical science. Here are the words of the decree:

So far is it from the mind of the Church to resist the advance of the human sciences and arts, that rather she helps and promotes them in various ways. For she neither ignores nor despises the advantages for human life that flow from them; nay, rather she declares that just as these sciences come from God, so, by the aid of His grace, they will lead back to Him if rightly employed.

Leo XIII was but echoing these words when he wrote:

As every newly discovered truth may serve to further the knowledge or the praise of God, it follows that whatever spreads the range of knowledge will always be willingly and even joyfully welcomed by the Church. She will always encourage and promote all study occupied with the investigation of nature.

And so this same Pontiff when writing a letter of encouragement to the members of the Scientific Society of Brussels could truly say:

It is opportune that there should arise on all sides men distinguished for science and piety, who, heartily attached to the doctrines and teaching of the Church, should apply themselves to prove that there can never exist any real opposition between science and religion.

Here, then, we have an express declaration of the benevolent attitude of the Church towards the human arts and sciences. And she welcomes them not merely for their spiritual possibilities but also on account of the material benefits that they bring to mankind. One of the most marvelous qualities of the Church—one, indeed, which could only spring from her Divine origin—is that sure instinct which has always led her to steer an undeviating course between the extremes of rigorism and license. Heresy, on the other hand, has usually fallen into one or other of these extremes, or more often still oscillated backwards and forwards between one and the other. We need only look outside the Church today and we shall witness this phenomenon in our own midst. We see those who lift their voices in

horror when our people indulge in the most innocent amusement on a Sunday, and yet they are unwilling or unable to induce their people to attend Divine service on that consecrated day. They attempt to perpetuate this puritanical idea of the Lord's Day, and yet they fail to raise their voices against the most unnatural vices which flourish in their midst. The Catholic Church, on the other hand, has always stood four-square in defense of the Ten Commandments; she will tolerate no tampering with them. She insists for example that her children sanctify the Sunday by attendance at Holy Mass: she advises them strongly to sanctify the evening by attendance at devotions; but when these duties have been performed she rejoices to see these same children of hers enjoying themselves in sinless amusements. The good things of this world have been poured out on men from the munificent hands of a loving God, and hence, as long as they are used properly by men, the Church, God's representative on earth, has no word of reproof to utter.

To come back, however, to our point: the material up-raising of the standard of human comfort, particularly amongst the poor, is, or rather ought to be, the result of the conquering march of science. Hence the Church, the guardian and friend of the poor, welcomes all such advances and raises her heart to God in thanksgiving for His gifts. Surely this wonderfully sane and consistent attitude is one of the marks which distinguish the true Church of Christ from the heretical sects, and stamps her with the seal of Divine guidance.

Having so far briefly considered the professed attitude of the Church towards physical science, let us now consider what has historically been her attitude when it has come to practice. It is, after all, against her practical attitude that here enemies have brought most of their charges. They admit that she may have paid lip service to the cause of progress, but they contend that in action she has always been an implacable enemy.

These charges might be met in two ways. We might take up one after another the examples of intolerance alleged by her critics and show in detail how groundless they are. On the other hand, we might take the more fruitful and, on the whole, satisfactory course of pointing out in broad outline the great services rendered at all times by the

Church to the advance of science. I propose to take the latter course, not because I fear to meet the charges made by adversaries—for I believe they are all capable of refutation and explanation—but because I consider that a recital of some of her services in the cause of science more convincingly demonstrates her real attitude of friendliness.

Let us, then, glance briefly at some of the great benefits conferred by the Church throughout her history on the cause of research and scientific progress. When one places before oneself such a vast field as this, it is difficult to know where to begin and where to end. For brevity's sake, however, I shall consider but two aspects of the question, namely, the work done by the Church in fostering higher education during the Middle Ages, and secondly, the contributions made to modern scientific progress, not by Catholic laymen but by Catholic churchmen themselves, who by their very profession fall in a special way under her jurisdiction and guidance.

When in the twelfth and thirteenth centuries a thirst for knowledge, stronger than at any other time in history, made itself felt in the Christian countries of Europe, the universities were founded as great international homes of science. Thousands flocked to them from all parts in order to gratify their deeply felt need of higher education. At these universities the students were taught theology, civil and ecclesiastical law, the liberal arts, and medicine—indeed, the whole gamut of learning as known in those times. Prior to the Reformation these universities were not mere State institutions as they afterwards became. They were free and independent corporations. They were complete in themselves, they made their own statutes, they had their own jurisdiction, they enjoyed many other valuable privileges.

Up to the year 1300, there were no less than twenty-three universities in Italy, five in France, four in Spain, two in England, one in Portugal. By the year 1400, they had increased in number to forty-six. Between 1460 and 1510, no less than nine new foundations took place in Germany.

The important fact, however, from our point of view is that they almost all owed their legal authority to teach and grant degrees to Papal charters. Since the universities were understood to confer degrees of international value, they had to be universally acknowledged: this could only

be effected by an authority of universal jurisdiction and hence they appealed for recognition either to the Pope or the Roman Emperor. The Popes had shown themselves such benefactors of these institutions, that they were usually appealed to on behalf of new foundations. Of the eighty-one universities established prior to the Reformation, thirteen had no charter, thirty-three had only Papal charter, fifteen had only imperial charter, and twenty had both Papal and imperial charter. In other words, of those who enjoyed full charters over three-quarters had received them from the Pope. These Papal charters which remain to us, breathe a spirit of warm benevolence and encouragement for the new advances in science. Pius II, for example, in his Bull founding the University of Basle says:

Amongst the blessings to which man by the grace of God can attain in this life, the least place is not to be given to persevering study, by which man can attain to the pearl of the sciences, which point out the way to a good and happy life, and by their excellence elevate the learned man above the uneducated. Science makes man like to God and enables him clearly to perceive the secrets of the world. For this reason the Holy See has always promoted the sciences, given them homes and provided for their wants. The Apostolic See desires the widest possible extension of science.

As this Pope insinuates, the Church was not satisfied with merely giving charters, but she also gave substantial material aid to most of the universities. The Popes themselves at one period maintained two universities in Rome. At the other places attempts to found and support universities would have failed had not the Popes provided the salaries of the professors by allotting for that end a portion of the income of parishes and churches. In Germany, we are told, the endowment of the universities was drawn largely, if not entirely, from the revenues of the monasteries and chapters. Pope and clergy, moreover, took incessant pains to make it possible for poor students to attend the universities in all faculties. We find frequent mention of stipends and legacies left for this purpose. In the course of time colleges were founded within the universities with the view of sheltering and maintaining poor students. The Popes took a foremost place in this work. Urban V, for example, supported a college at Bologna and founded another at Montpellier for medical students. During his pontificate this Pontiff maintained no less than 1,000 stu-

dents at various institutions. In 1359 Innocent VI devoted his own home at Toulouse, with all its possessions, to twenty poor students. For their maintenance he ordered 25,000 gold florins to be distributed amongst them.

Indeed, it cannot be seriously questioned that the medieval universities, in which after all the foundations of modern science were laid, owe their inception and success to the blessing and encouragement which they received from the Church. Denifle, at the conclusion of his treatise on the universities of the Middle Ages, truly says: "So far as the foundation of the universities can be spoken of, the merit belongs to the Popes, to secular rulers, clergy and laity. But that the lion's share belongs to the Popes every one must admit who examines history with impartiality." And Kaufmann, an agnostic hostile to the Church, writes that "numerous Popes have shown interest for the fostering of science during these centuries and were, for the most part, prominent men of science themselves."

Let us now turn our gaze to the progress made in the physical sciences in modern times. The birth of modern science is usually dated from the time when the experimental method was first systematically applied in order to lay bare the secrets of nature. That progress in these sciences has been amazing, there is no one who will deny. It has been rendered possible by the laborious and self-sacrificing labor of men and women in all parts of the world. All honor be to them! Amongst them Catholic laymen and women hold honorable and very prominent places. Let me just mention a few names. We have Fallopius, Versalius and Pasteur in medicine; Cuvier, De Rapparent, Deville, in geology; Galvani, Volta, Ampere, Coulomb and Ohm, all household names in the science of electricity; Lavoisier, Dumas, Chevreul, in chemistry. . . . The list might be extended indefinitely. I prefer, however, to insist on the work done in the cause of modern science by Catholic ecclesiastics. My reason for doing so is clear. If the Church in practice was hostile to scientific progress, these ministers of hers would never have been permitted to do the work they did. We do not read of Catholic clergymen who have made their mark in the fields of high finance or civil law, the reason being that the Church for good reasons bans the practice of these professions to her ministers. If, then, their names be found on the rolls of physical science, it is posi-



tive proof of the favorable attitude of the Church towards these branches of learning.

Let me now recall a few of these names to your memory.

Nicholas Copernicus is justly esteemed the father of modern astronomy. He was born in the year 1473 of a Polish father and a German mother. He, along with his brother and two sisters, were early in life enrolled in the Third Order of St. Dominic. His brother became a priest, one of his sisters a nun, and Nicholas himself entered the ecclesiastical state, although it is not certain whether he ever received major orders. He received his education at the University of Cracow and while there showed great interest in astronomical observation. In 1530 he published a short work in which he set down his chief discoveries in the form of propositions. He declared that the center of the earth is not the center of the universe but only its own center of gravity and the center of the moon's orbit. The planes of the planets' orbits pass through the center of the sun, which may, therefore, be considered as the center of the universe. The daily motion of the heavenly sphere is only apparent—it is the effect of the rotary motion of the earth. Here, then, we have the whole heliocentric theory clearly stated as an hypothesis 100 years before the episode of Galileo. Nor, indeed, was Copernicus the first to suggest that the earth moved, and not the sun. The first suggestion to this effect that we know of came from the pen of Nicholas de Cusa, a Cardinal of the Church. He wrote: "I have long considered that this earth can not be fixed but moves like the other stars. And to my mind the earth revolves upon its axis once in a day and a night." These words coming from the pen of a Cardinal, a personal friend of three Popes, and written a century before the birth of Galileo, are a curious commentary on the deductions drawn by hostile critics from the condemnation of this latter scientist. They clearly show that the Church was not adverse to such a scientific hypothesis if it was expressed in a sober and restrained manner.

In later life Copernicus published his great work, "*De Revolutionibus Orbium Celestium*": its dedication was accepted by Pope Paul III, and not one of the twelve succeeding Popes ever thought of proceeding against it. Later, owing to the troubles caused by Galileo, some verbal alterations were ordered. These corrections were unimportant as

regards actual science and merely insisted that the teaching of Copernicus was hypothesis (which it really was) and not actual demonstration (which it actually was not). History indeed tells us that the works of Copernicus suffered far greater opposition from the Reformers than they ever did from his Catholic co-religionists.

He ever remained the simplest of men and during his long career carried out faithfully the duties of his post of Canon of the Cathedral of Frauenberg. When he died there was, at his own request, engraven on his tombstone the simple prayer: "I ask not the grace accorded to Paul, nor that given to Peter, give me only the favor Thou didst show to the thief on the Cross." Here then we have Copernicus, the scholar, astronomer, and clergyman who lived in the pre-Reformation times. His life is the best possible refutation of the slanders with regard to the unprogressiveness of Church and churchmen in that epoch.

Let us turn our eyes now towards another astronomer, not of the sixteenth but of the nineteenth century. Angelo Secchi was born at Reggio, in Italy, on June 29, 1818. He was only fifteen years of age when he entered the Jesuit noviceship and but seventeen when he proceeded to the famous Roman College to pursue his studies. Such great aptitude did he show for physics and mathematics that on the completion of his course he was nominated assistant professor of these subjects. After his ordination he continued his previous work as professor, but in March, 1848, he was driven out of Rome along with his fellow-Religious, by the revolutionary government. He then visited England and America, showing great interest in astronomy, and was finally recalled to Rome two years later as director of the Observatory in the Roman College, a post which he held for the remaining thirty years of his life. The researches and discoveries he made during these years made his name famous not merely as an astronomer but as a meteorologist and magnetic observer. The discovery of the meaning of the lines found in the spectra of the heavenly bodies was first made by two German scientists, Kirchoff and Bunsen, in 1859. They pointed out that by observing these lines it was possible to find out the elements present in the various stars. Secchi was quick to grasp the importance of the new discovery, and shares with Sir William Huggins the distinction of being the pioneer of astronomical spectro-

scopy. He observed and studied the spectra of no less than 4,000 stars, and the four groups into which he divided them are still the foundation of the modern classification of spectra. He, moreover, executed a long series of observations on sun spots, studied the atmosphere which surrounds the sun, headed two expeditions for the observation of the sun's corona during the eclipse, made many observations of double stars, and gave detailed descriptions of no less than twenty-one nebulae. He was employed by the Pope to design and superintend the erection of lighthouses on the coasts of the States of the Church, and even the schemes for the water supply of several Roman towns were committed to his care. He published numerous catalogues and lists of star spectra, wrote several popular books on astronomy—his book on the sun was translated into almost all the languages of Europe—and communicated over 700 memoirs to various learned societies, thirty-seven of them being to the Royal Astronomical Society of England. Honors fell thick upon him. He was invested with the Legion of Honor by Napoleon III; he won a prize of 100,000 francs at the Paris Exhibition of 1867 for a meteorograph which he had invented, he was elected a foreign member of the Royal Society of London, a member of the British Astronomical Society, of the French Academy of Science, of the Imperial Academy of St. Petersburg, while the honors conferred on him in his own native land are too numerous to mention. In the obituary notice which appeared in the monthly reports of the Royal Astronomical Society after his death, it is recorded that his career "had shed luster on his country and added another to the long list of names of which the Jesuits are so justly proud." He was at the same time an exemplary Religious. When dying he sent to Pope Pius IX for the last blessing of the Church. "Willingly do I grant it," said the Pope, "for Secchi has always known how to unite science with religious virtue. Truly he has been an excellent Religious." Here then we have a man held up by a great scientific society as an ornament to science and at the same time praised by a Pope as a model religious man. And yet the old calumny still perseveres that the religious and scientific frames of mind are quite incompatible!

Let us now turn to a clerical figure whose name is enrolled amongst the pioneers of the modern science of chemistry—I refer to the Benedictine monk, Basil Valentine. We

know little of his life story—not even the dates of his birth and death—but his name lives in his works. He flourished in the days of the later alchemists, but he was one of the first who broke away from that tradition and introduced the experimental methods of modern chemistry. The study of chemical compounds from the point of view of their influence on agriculture and medicine was his chief work. His experiments and results formed the basis of the method by which the chemical side of medicine was destined to develop during the following two or three centuries. To Valentine we owe the discovery and introduction of many chemical substances, such for example as hydrochloric acid, and his method of preparing this acid was not very different from that employed at the present day. He discovered also the method by which metallic copper could be obtained from its salts. He seems to have anticipated the true explanation of the theory of respiration and pointed out that even fishes require the air that is contained in water to enable them to live. His great work, however, was a treatise entitled "The Triumphal Chariot of Antimony," in which he communicated to the world the chief properties of this remarkable metal. An old story, unfortunately not very well founded, explains the cause of his interest in the metal. While experimenting with a number of metallic salts, he one day threw out some antimony compounds from his laboratory window and he noted that the swine of the monastery came along after a while and gobbled them up along with some other refuse. Being of an inquiring frame of mind, he watched for the effects of this meal and found that after a period of digestive disturbance, these swine developed an enormous appetite and rapidly became much fatter than any of their fellows. This seemed a result which had great possibilities and Basil determined to use it to good purpose. In the monastery there were several monks of frail health and gaunt proportions, and the charitable thought entered his mind that the putting on of a little fat in their case also would be most advantageous. Accordingly he surreptitiously introduced some of his antimony products into the food served to these monks. But, alas, the effects were quite different from what he had expected. The monks became violently ill and indeed, according to one version of the story, some of them even perished as the result of the indigestion caused by Basil's kindness. As a result of the in-

cident, we are told, he called the new substance antimony, that is, opposed to monks—it might indeed be good for hogs but it was something that monks had better leave alone. Antimony, however, has many useful medicinal properties and these were placed at the disposal of medical science through the pioneer work of this humble and obscure son of St. Benedict.

The history of anatomy and that of geology have few more honored names than that of Nicholas Stensen, a bishop of the Church. Of Danish origin, he was born at Copenhagen, January 20, 1638, of Lutheran parents. His conversion to the Faith took place when he was about thirty years of age; soon afterwards he was ordained priest and later in life was raised to the episcopacy. His early years were devoted to the study of medicine and anatomy and in these studies he soon made a name for himself as an original investigator. He was the discoverer of the first external gland known to medicine—the parotid gland—which is still known as the duct of Stensen. In his chief work, "Anatomical Observations concerning the Muscles and Glands," he demonstrated for the first time the muscular nature of the heart and gave accurate and original descriptions of the blood vessels of the nose and of the lachrymal gland. Amongst his contemporaries he was acclaimed the greatest anatomist of his day on account of his acuteness of observation. Nor is his fame yet dead. Haeser in his "History of Medicine" writes:

Amongst the greatest anatomists of the seventeenth century belongs Nicholas Stensen who was rightly considered in his own time as one of the greatest of anatomical observers. There is scarcely any part of the human body the knowledge of which was not rendered more complete by his observations.

On the walls of the Protestant University of Copenhagen, amongst the portraits of its celebrities, there hangs today the picture of this Catholic Bishop whom the University deems it an honor to have once sheltered within its precincts both as a student and later as a professor.

In the science of geology, however, Stensen holds even a more honored place. Indeed he has been called the father of this branch of science. Moreover, practically all his work in this subject dates from the Catholic portion of his life. He laid down all the fundamental principles of this

science. Many distinguished scientists have insisted that no greater advance at the birth of a science was ever made than that which Stensen accomplished for geology. None of his successors have succeeded in introducing so many fruitful points of view as this first great observer. For over a century geologists remained far behind him in creative genius, so that there is little progress worth mentioning until almost the beginning of the nineteenth century, although his little book on the subject was published in 1668 or 1669. He had carefully observed the various strata of the earth's surface when exposed by excavations. He explained them thus: "The powdery layers of the earth's surface must necessarily at some time have been held in suspension in water, from which they were precipitated by their own weight. The movement of the fluid scattered the precipitate here and there and gave to it a level surface." Having thus explained the origin of geological strata, he went on to explain the real nature of fossils, which had never been understood up to this time. "The powdery material of the earth's surface," he writes, "took on so completely the form of the bodies which it surrounded that even the smallest apertures became filled up and the powdery layer fitted accurately to the surface of the object and even took something of its polish." He explained the remains of sea animals found on land and the origin of mountains. If there be found in the strata traces of sea salt or the remains of sea animals, then it must be recognized that this portion of the land's surface was once below the level of the sea. The great distance from the sea or other body of water at the present time, may be due to the sinking of the water level or to the rising up of a mountain from some internal terrestrial cause. Here, then, are expounded, by this holy Bishop, all the fundamental principles on which the modern science of geology is founded.

A great congress of scientists met in Florence in 1881 and erected a memorial tablet to Stensen in the church where his mortal remains still lie. The inscription runs thus:

You behold here, traveler, the bust of Nicholas Stensen, as it was set up by more than 1,000 scientific men drawn from the whole world, as a memorial to him on the fourth of the kalends of October, 1881. The geologists of the world, after their meeting at Bologna, under the Presidency of Count John Capellini, made a pil-

grimage to his tomb, and in the presence of the chosen representatives of the municipality, and of the learned professors of the university, honored the mortal ashes of this man, most illustrious amongst both geologists and anatomists.

This illustrious man, therefore, found the scientific and religious attitudes of mind so little incompatible, that in the heyday of his fame as a scientist he humbly sought admission to the true Church of God and after his reception therein carried on his scientific work with greater and still greater renown.

The foundations of the science of crystallography were laid by the Abbé Hauy, who first saw light in the little village of St. Just, in France, on February 28, 1743. Born of poor parents, he would never have received a fitting education but for the kindness of the Premonstratensian monks of his native village. With their aid he was enabled to attend the College of Navarre, in Paris, and there, on the completion of his course, he obtained a college lectureship. Soon after his ordination to the priesthood, he turned his attention first to botany and later to the study of mineral crystals. This latter study soon gave rise to such original discoveries that his name became famous as one of the foremost scientists of the day. He diligently studied crystal form: he showed that each mineral salt had its own particular form of crystal which depended on its chemical constitution. He pointed out that when the crystallic forms of two minerals were essentially different, then no matter how similar they might be in appearance, there was sure to be some chemical difference. He founded the science of pyroelectricity, also, by his researches into the electric properties of crystals. His treatise on mineralogy and crystallography clinched his fame. He was elected professor of those sciences in the University of Paris and director of the Paris Museum of Natural History. During an illness he was visited in person by Napoleon himself, who remarked to the doctor: "Remember that you must cure Abbé Hauy and restore him to us as one of the glories of our reign." He was invested by Napoleon with the newly founded Legion of Honor. Learned scientists and even crowned heads came from all parts to visit him. Yet amongst all these honors he ever remained the humblest and most retiring of men. He was passionately attached to his Faith and had to suffer much as a result. During the revolutionary times he

refused to subscribe to the civil constitution of the clergy, and went into prison rather than violate the dictates of his conscience. Cuvier wrote of him: "He was as faithful to his religious duties as he was to the pursuit of his studies. The profoundest speculations with regard to the weighty matters of science had not kept him from the least important duty which his ecclesiastical regulations might require of him." Sir Bertram Windle justly writes:

There is perhaps no life in all the history of science which shows so clearly how absolutely untrue is the declaration so often made, that there is essential opposition between the intellectual disposition of the inquiring scientist and those other mental qualities which are necessary to enable the Christian to bow humbly before the mysteries of religion.

For my last example I propose to come down to more recent times and enter into the domain of biology. Gregory John Mendel was born July 27, 1822, in Austrian Silesia. After a good education he entered the noviceship of the Augustinian Order at Olmutz when he was twenty-one years of age. Three years later he was ordained priest and for several years taught natural history with great distinction in the high school at Brunn. At the end of this time his superiors, whom the enemies of the Church would have us know as the arch-enemies of progress, so far belied this charge as to send the young priest to Vienna to do post-graduate work in natural science. He returned to Brunn on the completion of his course and continued his work of teaching until, somewhat later, he was elected abbot of his monastery, a position he held for the remaining sixteen years of his life. It was, strangely enough, during these years that his great scientific work was done. By a wonderful series of scientific observations and experiments, he discovered the main principles which underlie the hereditary transmission of vital characteristics. These results are too complex and technical for me to explain to you at any length this evening—suffice it to say that they challenged and overthrew many of the gratuitous assumptions of the Darwinian school. I can best communicate to you the position which he holds in the scientific world by quoting some of the encomia paid to him by present-day men of science. Professor Hunt, the biologist, considers that Mendel's work gives the final *coup de grace* to the theory of natural selection.



If [he says] we reject Darwin's theory of natural selection as an explanation of evolution, we have at least a new and promising outlook in another direction and are in a position to answer the oft-heard but unscientific query of those who must cling to some dogma: "If you reject Darwin, what better have you to offer?"

Professor W. E. Castle of Harvard University, has written: "What will doubtless rank as one of the greatest discoveries in the study of biology and in the study of heredity was made by Gregory Mendel, an Austrian monk, in the garden of his cloister, some forty years ago." And Professor Bateson, the eminent biologist, has declared: "I think that I use no extravagant words when I declare that his experiments are worthy to rank with those which laid the foundation of the atomic laws of chemistry." We have, then, in Mendel one who, on the very admission of scientists themselves, stands foremost in the ranks of biologists and who at the same time was an abbot of a religious monastery. And yet Huxley, Draper, White and *hoc genus omne* never tire of laying down as a self-evident principle that no one can be a member of the Catholic Church and at the same time a real votary of science. . . .

To sum up, then, what has been said. I have pointed out to you the widespread belief which exists, even amongst fair-minded non-Catholics, that the Church is hostile to scientific progress. I have attempted then to show how baseless this charge is, by considering in some detail the official doctrine of the Church on the relations which must exist between science and religion. These amply prove the benevolent attitude of the Church towards all progress in the sciences and arts: from them she has nothing to fear—they only proclaim to man the infinite power and wisdom of the One True God, whose existence and law it is her Divine mission to preach. We went on to see that the Church holds these principles not merely in theory but that she has put them into practice all through her history. To illustrate this fact I briefly summarized the role played by the Church in the foundation of the universities, those great centers of secular learning. Afterwards I placed before you a few examples of the work done by the Church's own ministers, with her blessing and encouragement, in forwarding the triumphal march of science. Looking at that record, no Catholic need hang his head; nay, he may be justly filled with pride at the immense part played by his Church

in the cause of scientific progress. Surely if there be any non-Catholics who, after looking all this evidence in the face, still continue to believe that the Church is hostile to natural science, they must be numbered amongst those "who have eyes and see not."

## St. Augustine—Philosopher

REV. CHARLES BOYER, S.J.

*The following article by an authority on Augustine and professor of dogmatic theology at the Gregorian University, Rome, is reprinted from the Modern Schoolman, May, 1930.*

FENELON once said that if we were to collect all the passages in which St. Augustine treats of metaphysics we would have an anthology surpassing in depth and richness the whole philosophical output of Descartes. And Eucken dared write that Augustine is the only truly original thinker that has appeared in the Christian era. Yet it is a fact that the serious students of Augustine's philosophy are few. In the manuals he receives about as much attention as Wundt, Reid or Royer-Collard; even learned treatises on the history of thought fail to mention his name, or else they pass him off in a line or two as being, above all, a theologian (though that, in itself would not hinder his being a first-class philosopher); or, finally, their brief mention consists in showing how his ideas can be reduced to those of Plotinus or of Plato (a somewhat summary judgment).

Before we consider why Augustine finds such scant favor as a philosopher, it may be well to observe that a philosopher's reputation depends at times on other things besides his intrinsic worth. It is obvious now that Locke, Condillac and Cousin have been overrated. But that is easily explained. They made easy reading; what they did have to say was easily understood. Not that the converse is always true; the difficulty of grasping an author does not of necessity preclude his popularity. Consider Kant, Hegel, and any number of our contemporaries. But this much is true, when an author is difficult, one must be driven to study him by some strong motive. If, for example, he is the vogue, that is sufficient motive for some.

The study of Augustine is not without its difficulties.

And it seems that neither the vogue nor any other special reason at present urges that study in despite of the difficulties. So it is not overly strange that the few who study him are theologians or psychologists, or men of letters, such as Louis Bertrand or Giovanni Papini. But the latter are usually content to retell after their own fashion the story of the "Confessions."

Just what presents the difficulties in the study of Augustine's philosophy? First of all, the fact that the matter must be organized. There is plenty of philosophy in his works, but it is distributed throughout their tremendous extent. Before becoming bishop, Augustine did, it is true, write a series of opuscula that are almost entirely philosophical and which in fact contain the essentials of his thought (especially true of the sixth book of "De Musica," "De Magistro," and "De Libero Arbitrio"). But they are the work of his younger years, and we rarely find in them the perfection of form and substance which distinguish his later productions. After assuming the episcopal dignity he writes on philosophy only when his main subject, Scripture or theology, demands it. Thus it is, for example, that one finds in his work on the Holy Trinity an exhaustive examination of the nature of the human soul. Throughout the "City of God" he discusses and passes judgment on the philosophies of the past, the while developing his own moral doctrine. His theory of the *rationes seminales* and invaluable chapters on cognition appear in an exegetic work, "De Genesi ad Literam." But it remains a fact that if we want to explore with satisfactory results these philosophical clearings hidden in the forest fastnesses of theology and exegesis, we must first have some acquaintance with the forest as a whole.

Add to this difficulty the fact that the philosophical language of Augustine is in large measure the language of an inventor. His terms are clear enough provided one transports oneself to the times of Augustine; but there is always the danger of badly misinterpreting them by giving them a meaning which they did not receive until a later period.

While it is, therefore, evident that the study of Augustine's philosophy is not easy it is just as certain that the effort its mastery requires is repaid magnificently. Without exaggerating, as Eucken does by ignoring any number of first-class Christian thinkers, one must admit that Augustine

is great not merely as a theologian, but as a philosopher as well. True, his thought is first framed in Plotinism, but it has retained or shortly regained its own suppleness and independence. Itself fermented by the yeast of Revelation (if we may use that phrase) it acts upon Plato and Plotinus just, as later, the thought of St. Thomas works upon Aristotle, Averroes, and Avicenna, and transforms the ancient into the Christian philosophy.

Augustine's philosophical effort is concentrated upon God and upon the soul. (That does not mean that he has not remarkable pages on matter and form, on the evolution of the living world; but these emerge, as it were, from the exigencies of his principal subject.) How earnestly he examines the problems that touch upon God; His existence, His transcendence, His action in the world. His continual influence upon our intellects and wills! How deeply psychological are his soundings of the nature and activities of the human soul! Sensations, judgments, volitions, metaphysical conditions of our thought and willing, upon them all he projects a revealing light which the philosopher of today might with profit utilize.

Just now there are many reasons for believing that the world at large is coming to a more just appreciation of Augustine as a philosopher. Of late years the already vast bibliography on his life and works has been lengthened by notable names. Not to mention the works of Père Portalié and of Abbé Martin, we have welcomed the widely esteemed studies of Etienne Gilson, of Msgr. Grabmann, of Cayré, of Dom Butler, and many others. Many more will undoubtedly appear during the present year, when the fifteen hundredth anniversary of his death is being commemorated throughout the Christian world. Let us hope that these studies will attract the attention not only of the public, but also of the organizers of philosophy syllabi in the universities; and also that they will rouse in many the energy to familiarize themselves with the philosophical treasures of Augustine.

It is not too much to say, in conclusion, that Catholics owe it to themselves to cooperate toward this Augustinian revival. Does it not seem entirely fitting that they should be the leaders in the knowledge and utilization of the incomparable Doctor whom Divine Providence has given to the Church?